SepticSmart!

Understanding Your Home's Septic System

Canada

Ontario

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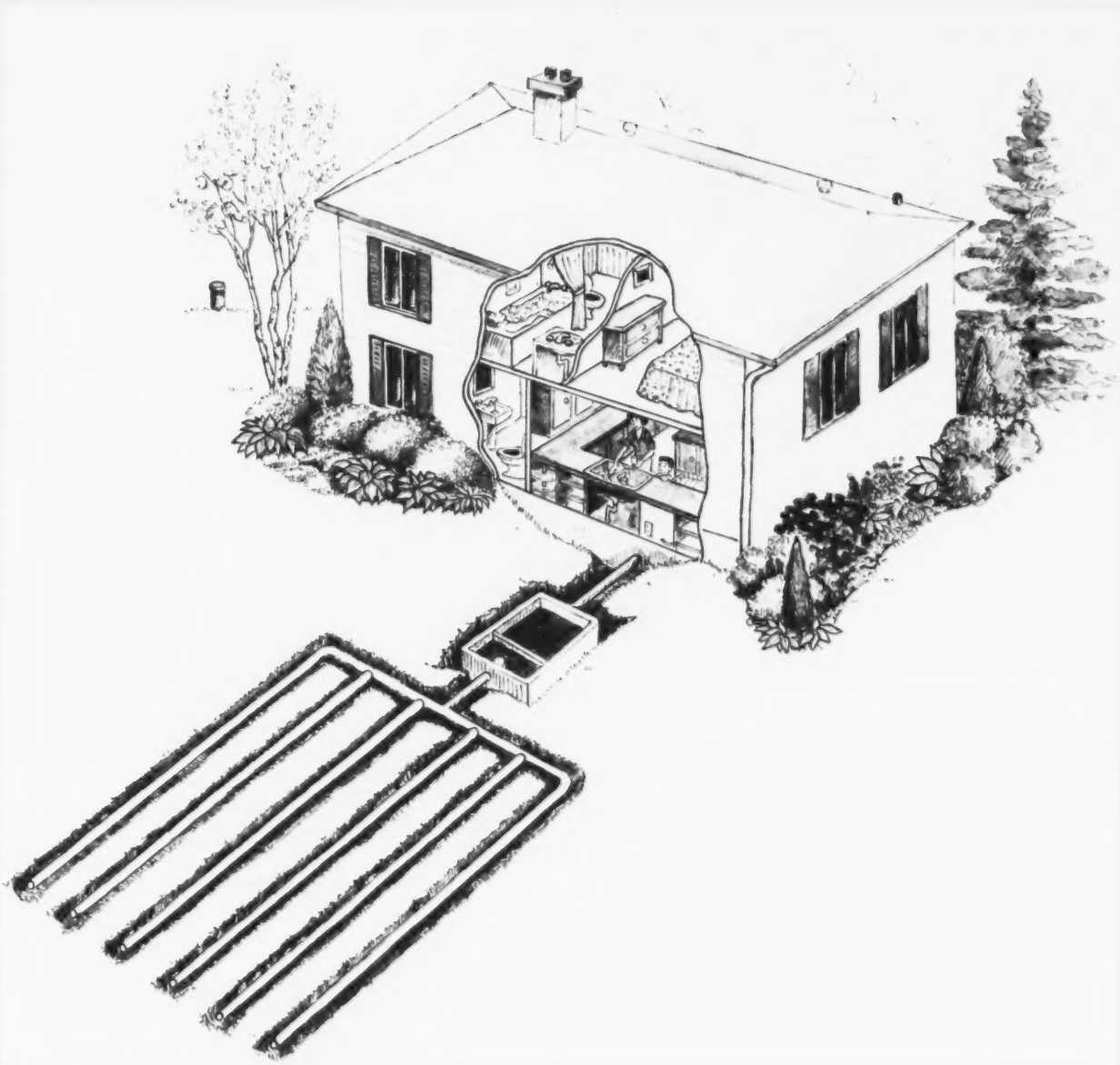

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What Is A Septic System?

If you live in a rural area or a small community or if you have a cottage, chances are you have a septic system. Septic systems are onsite treatment units that eliminate the need for municipal sewers in rural areas. Anything that goes down the drain — every shower drip and every toilet flush — flows to the septic system. Septic systems are comprised of a tank, a network of pipes and billions of organisms that process your waste.

This booklet will help you become familiar with how your system works and how to keep it working properly. It is important to know that you are responsible for your septic system and that it is in your best interest to take good care of it — from a health, financial and environmental perspective.

Septic systems are also known as:

- on-lot systems
- onsite systems
- individual sewage disposal systems
- onsite sewage disposal systems
- onsite wastewater treatment systems
- sediment tank and treatment trench systems

How Does It Work?

The most common septic system consists of a septic tank and leaching bed — all of which is hidden beneath the soil.

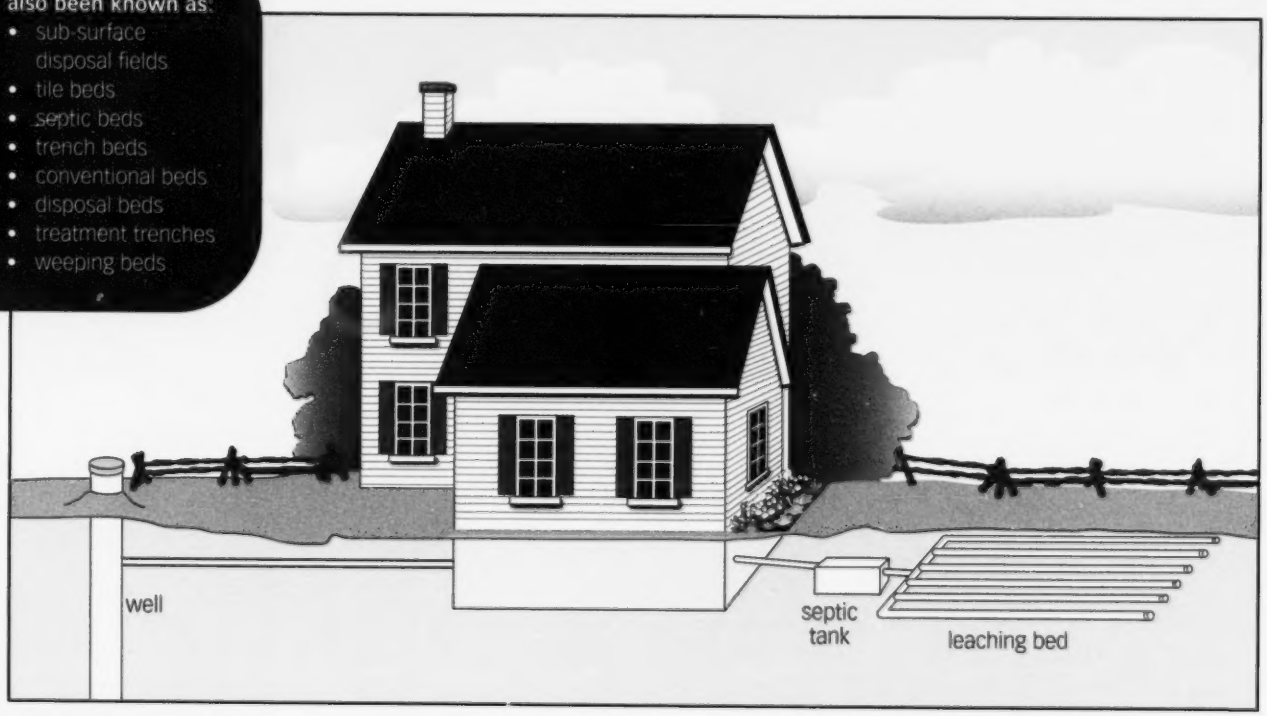
All household wastewater exits your home through an underground pipe that leads to the buried septic tank. The waste flows to the first compartment of the tank where the heavy solids settle and the lighter materials (fats, oils and grease) float to the top as scum. Baffles and screens (see illustration on page 3) keep this scum layer from escaping the tank and flowing to the leaching bed. This scum is removed when the tank is pumped during regular maintenance (see *Why Should I Maintain My Septic System?* on page 8).

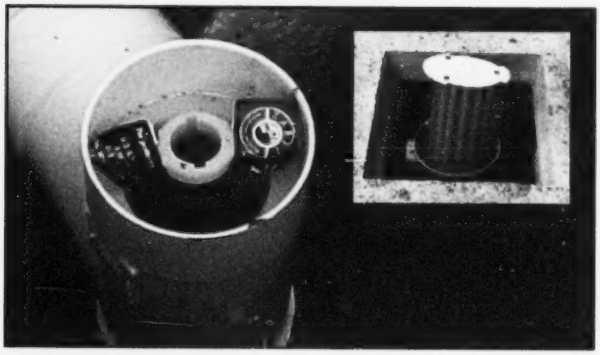
In the second compartment of the tank, finer particles settle to the bottom. Organic materials break down in the tank. On newer systems, any remaining organic material is trapped and decomposes on a screen called the effluent filter located at the outlet of the tank. As of January 2007, effluent filters became mandatory on all new installations and upgrades in Ontario.

From the tank, the effluent moves to a leaching bed made up of a network of perforated polyvinyl chloride (PVC) drain pipes. Stone and a layer of unsaturated native soil or imported sand surround these pipes. The effluent flows to the leaching bed either by gravity or a pump depending on site conditions. The

Leaching beds have also been known as:

- sub-surface disposal fields
- tile beds
- septic beds
- trench beds
- conventional beds
- disposal beds
- treatment trenches
- weeping beds





Effluent filter in septic tank.

Septic tank and leaching bed.

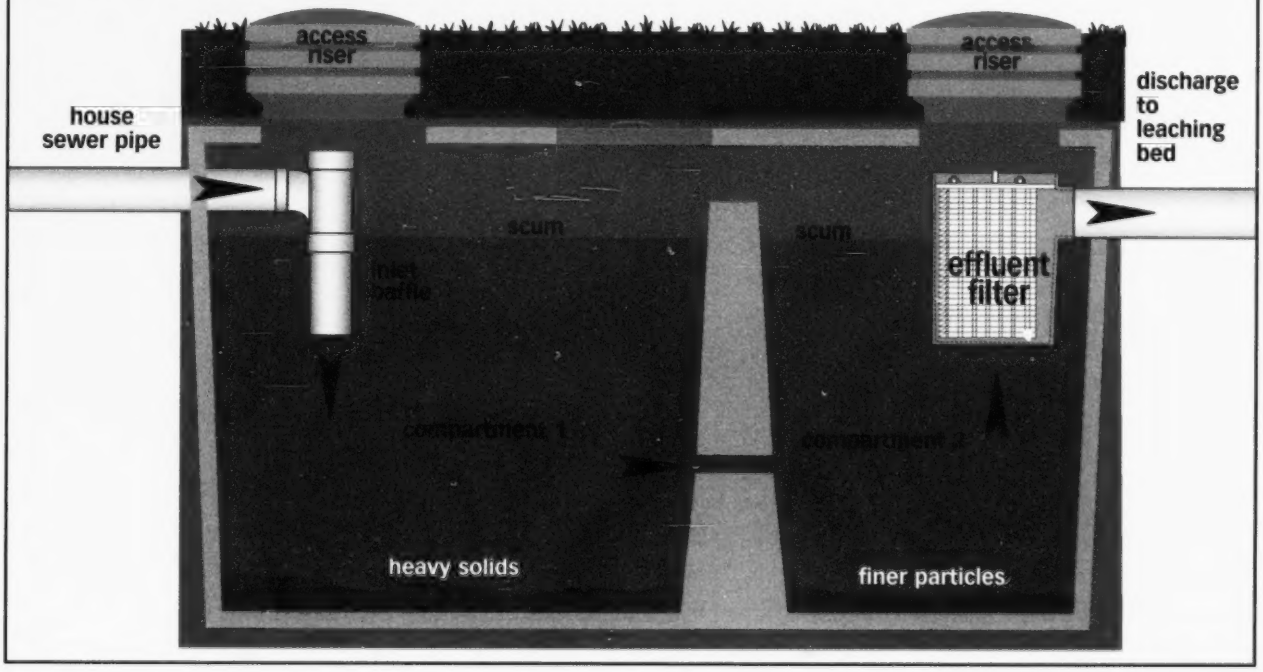
leaching bed's perforated PVC drain pipes disperse the effluent, allowing the liquid to seep into the ground where bacteria and other organisms process the wastewater further. Soils below the stone in the trench bottom act as a biological, chemical, and physical filter to remove most remaining organic and biological contaminants.

In Ontario, the *Ontario Building Code* (OBC) governs nearly all rural septic systems. If you are installing, repairing, upgrading or replacing such a system, you must contact your local regulatory agency. It may be your municipality, health unit or conservation authority that inspects systems, issues permits, maintains records and enforces Part 8 of the *Ontario Building Code*.

Did You Know?

The soil under the stone in the trench bottom of a properly working system can remove 99 percent of the *E.coli* for every 30 centimetres (12 inches) of unsaturated soil.

Parts Of The Septic Tank



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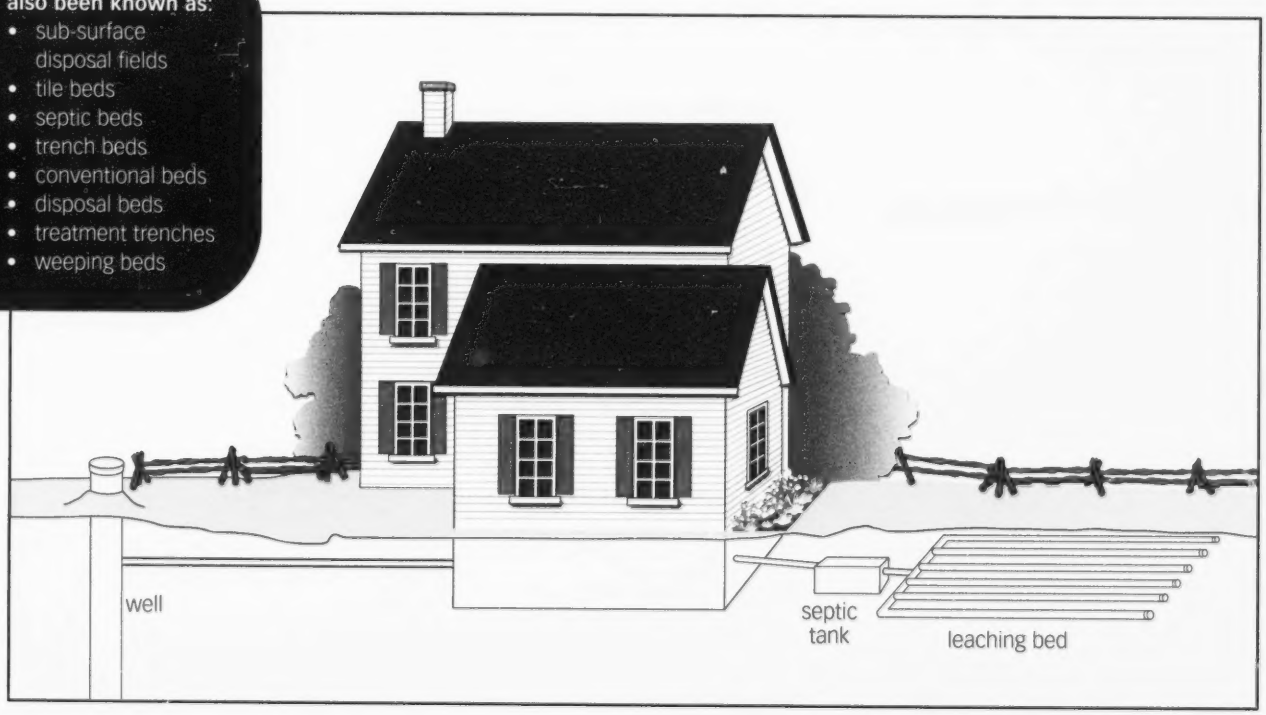

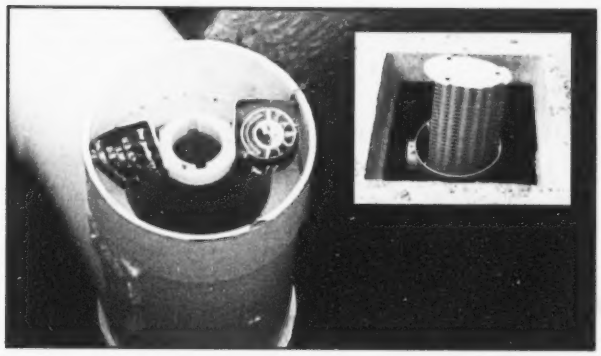

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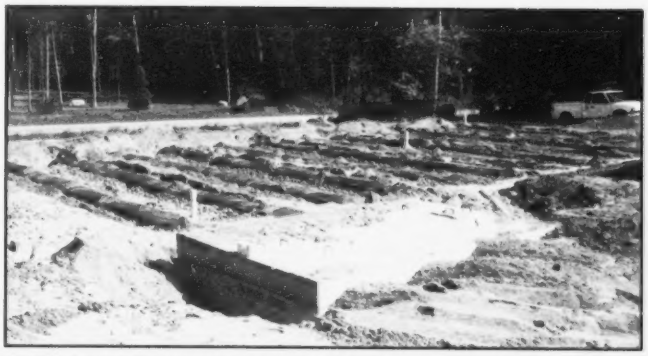

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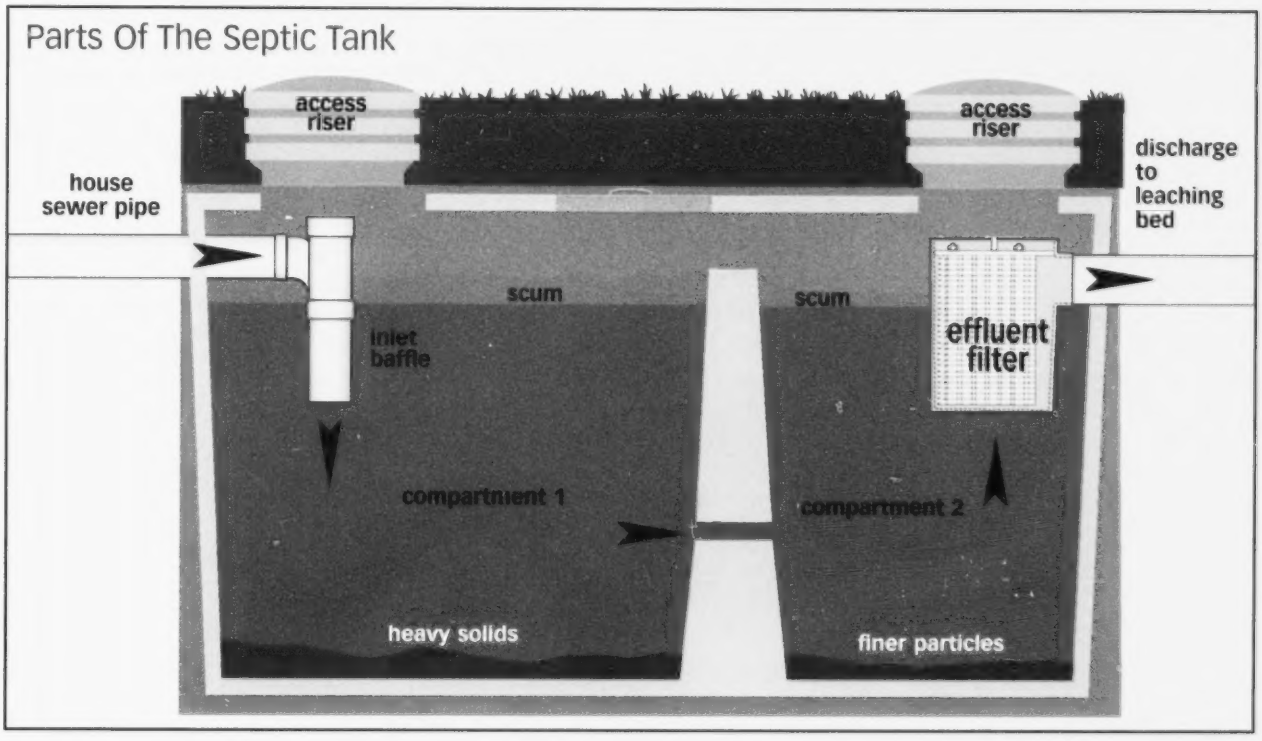


Your Class 4 Rural Septic System

Most rural homes use a Class 4 septic system as recommended in the *Ontario Building Code*. A Class 4 septic system uses a septic tank along with a leaching bed or a filter bed. The same bed types can look very different from site to site as the specific design is based on flow volumes from the house, space available in the yard, topography, soil material and depth to bedrock and/or other issues related to the property such as proximity to surface water and groundwater.

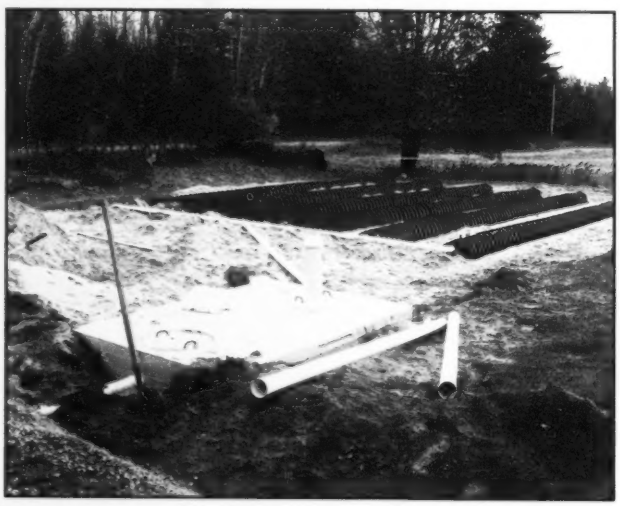
Types of Systems

In Ontario, the *Building Code* contains five classes of systems:

- Class 1 — all forms of privies, composting toilets, chemical toilets, incinerating toilets, re-circulating toilets and self-contained portable toilets
- Class 2 — greywater system
- Class 3 — cesspool
- Class 4 — leaching bed systems
- Class 5 — holding tank

Leaching bed with perforated PVC drain pipes.

Filter media bed.

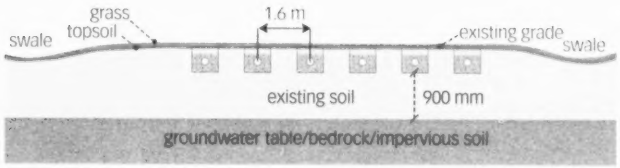


Leaching bed with gravelless trench technology.

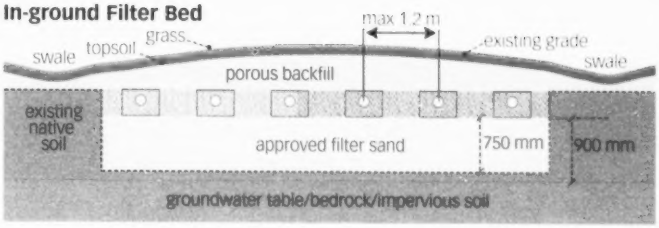
Did You Know?

Gravelless trench technology can be used instead of stone and perforated PVC drain pipes.

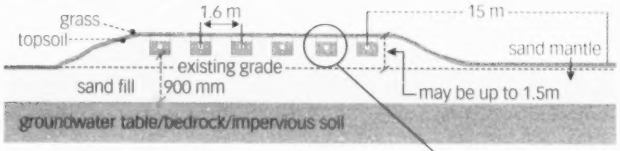
In-ground Leaching Bed



In-ground Filter Bed



Raised Leaching Bed



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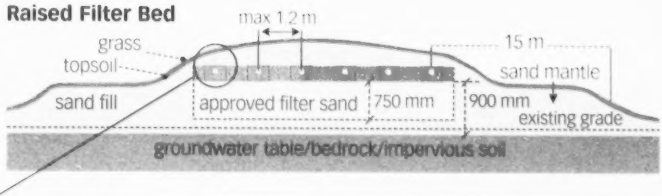
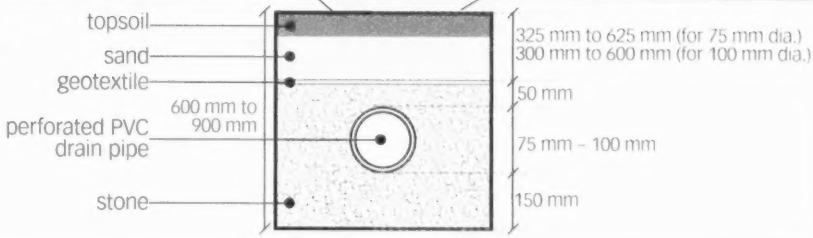
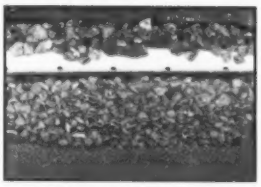


Absorption Trench
End view cross-section.





Absorption Trench
Longitudinal cross-sectional view.

Leaching Bed — in-ground leaching bed or raised leaching bed*

Description:

- a series of trenches with stone on the trench bottom and perforated PVC drain pipes above
- stone and geotextile fabric cover the drain pipes
- backfilled with sand and topsoil
- the length and number of absorption trenches depends on percolation rate of the native soil and daily sewage design flow

Advantages:

- less expensive because you can use native soil as backfill
- usually a gravity-fed system where no pumps are required

Disadvantages:

- space may be an issue on smaller lots
- may be hard to find good quality stone for absorption trenches
- raised leaching beds are more expensive than the in-ground type because imported sand is required to construct the trenches
- raised leaching beds require increased separation distances

* *Raised leaching beds are the same as in-ground leaching beds except they are above existing grade. Raised beds are built above grade because regulations require certain separation distances between the bottom of the absorption trenches and high groundwater levels, bedrock or impervious soils.*

Filter Bed — in-ground filter bed or raised filter bed**

Description:

- no trenches, one large bed
- the bed is prepared with a special "filter sand" that is a specified grain size to allow for optimum percolation while treating the effluent
- perforated PVC drain pipes are laid on a continuous stone layer over the filter media sand

Advantages:

- the system is smaller making it ideal for small lots where separation distances may be an issue

Disadvantages:

- filter sand is costly because it is hard to find and in most cases needs to be processed to a specific criteria
- can't process heavy flows as effectively as a conventional bed
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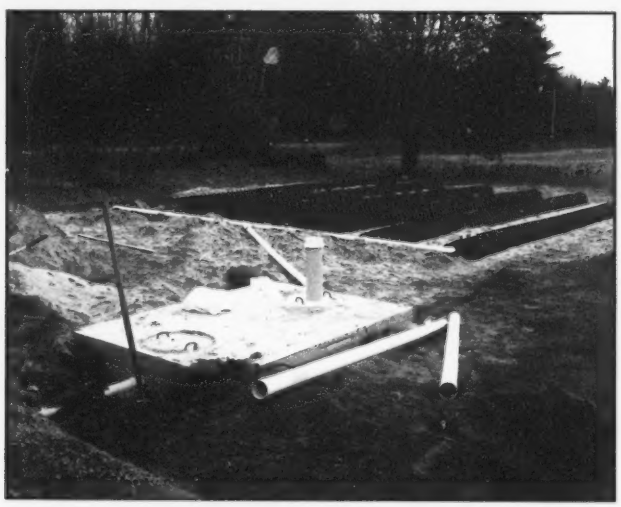
Leaching bed with perforated PVC drain pipes.

Filter media bed.



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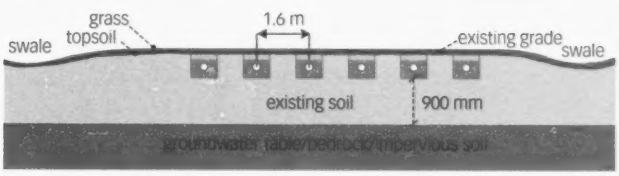

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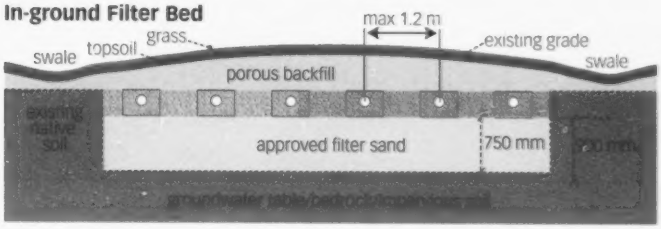

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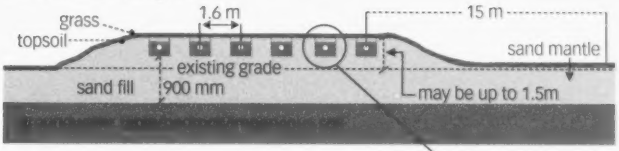

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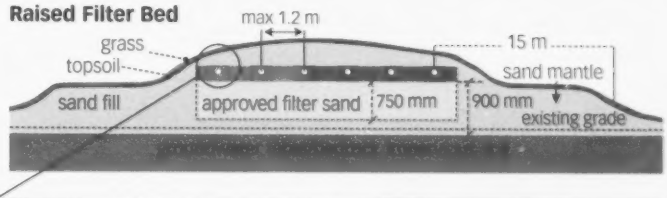

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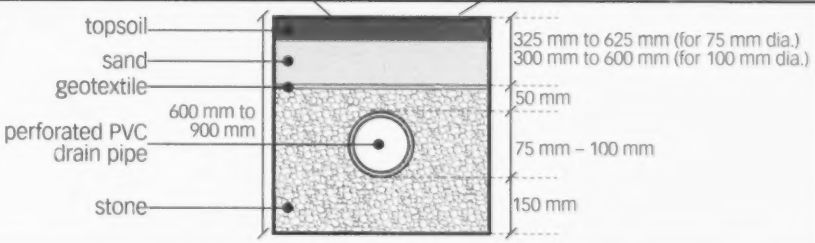

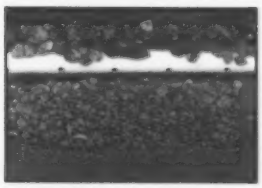

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What Could Be Hiding Underground?

You could have some very old technology working for you. In the past, steel tanks, cinderblock tanks or poured-in-place concrete tanks were used. Septic system technology is constantly changing and improving. Today, septic tanks are either pre-fabricated concrete or plastic.

Since the mid-1970s, septic tanks are required to have two compartments. Old tanks may only have one compartment.

Today's pipes used in leaching beds are plastic, but in the past clay tiles, asbestos pipes and non-corrode pipes were used. Today's spacing for leaching bed pipes is 1.6 metres (5.25 feet), but you may find only 0.9 metre (3 feet) spacing in older systems.

If you find these older features, it doesn't mean your system isn't functioning properly, but it certainly indicates its age and that it may not be working to today's standards.

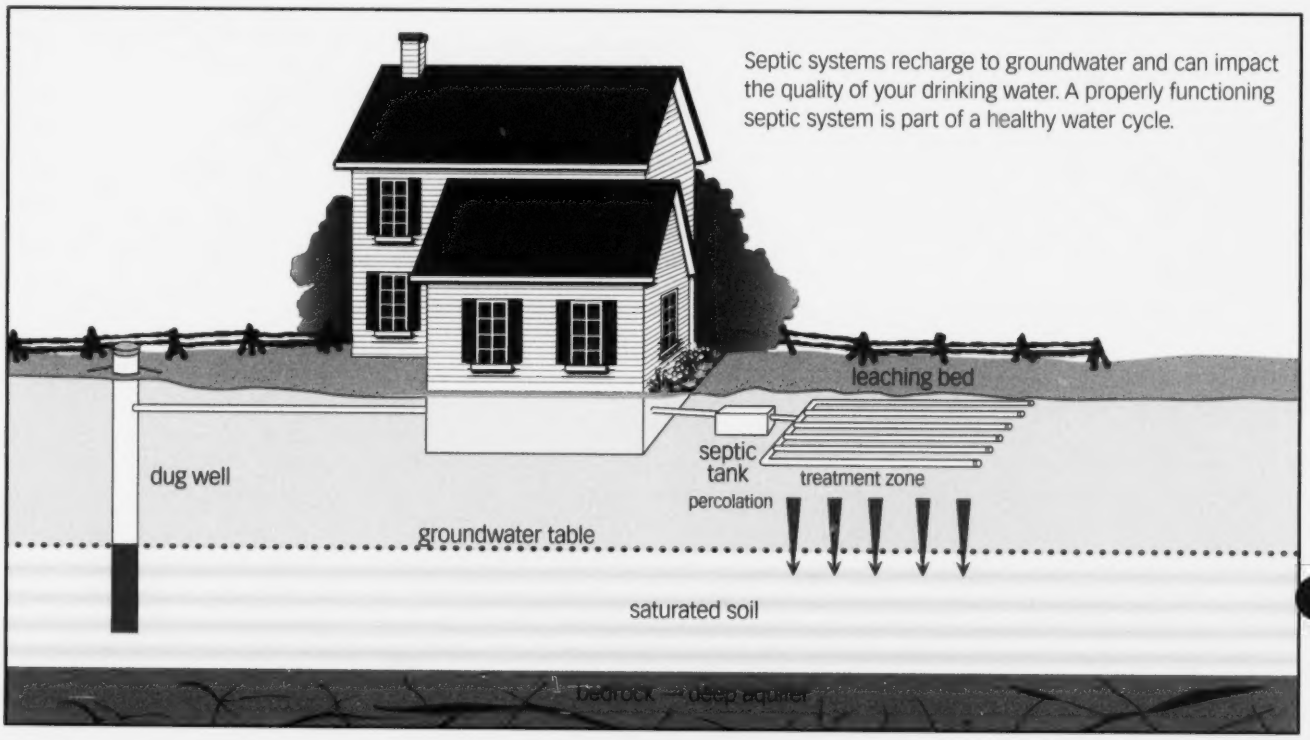
Septic Systems And Your Health

There are many contaminants in wastewater that can affect your health and the environment. They include bacteria, viruses, parasites and nitrate. If contaminants reach your drinking water supply, they can cause diseases or other health or environmental problems.

A properly functioning septic system will remove most contaminants to acceptable levels. However, treated wastewater that percolates through the soil may still contain contaminants that can enter the groundwater table. To reduce the risk to nearby ground or surface water supplies, the location of your septic system is critical.

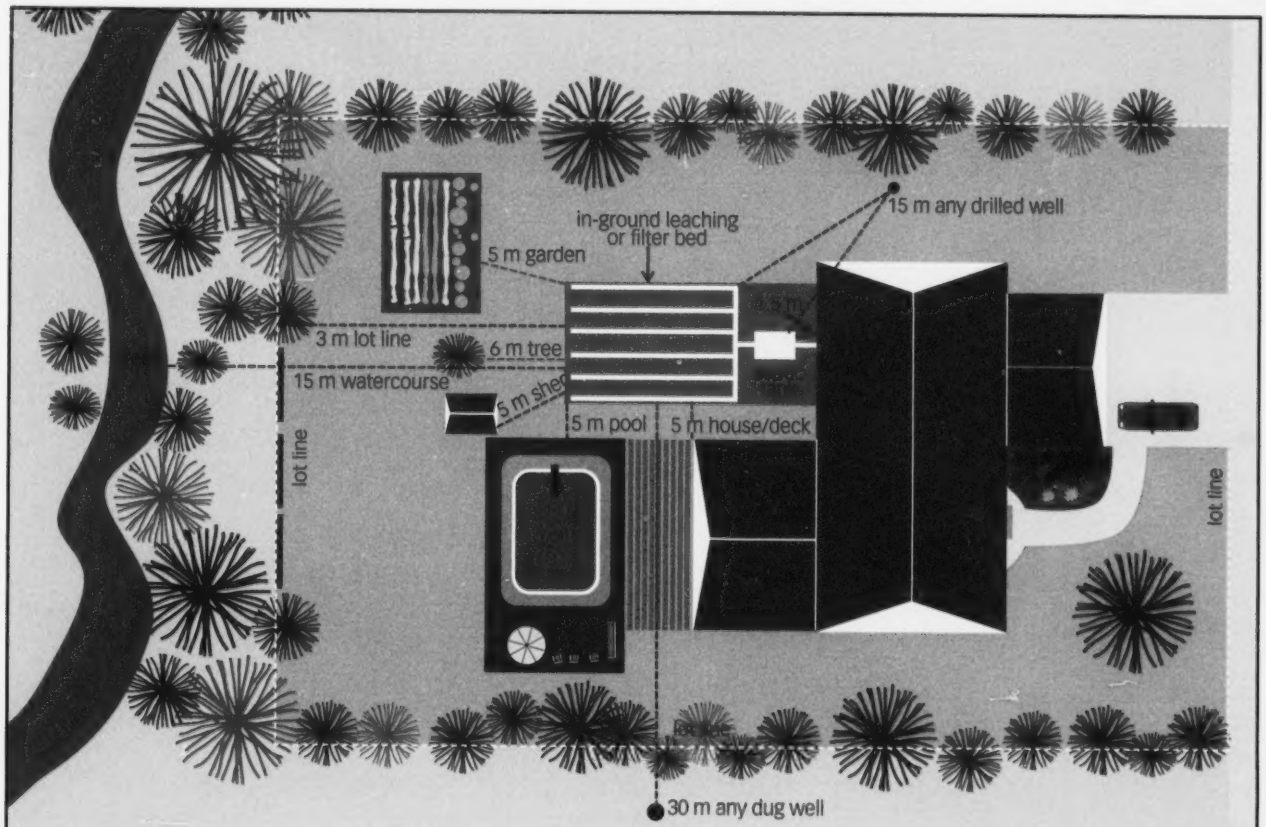
There are legislated minimum separation distances required between your septic system and your home and well, neighbouring homes and wells and nearby bodies of water. Respecting these distances and planning your lot accordingly will lead to a healthier, longer-lasting system.

To learn more about the basics of rural wells, pick up a Private Water Systems Information Package or a copy of the Best Management Practices book *Water Wells* available free from your local health unit.



Septic systems recharge to groundwater and can impact the quality of your drinking water. A properly functioning septic system is part of a healthy water cycle.

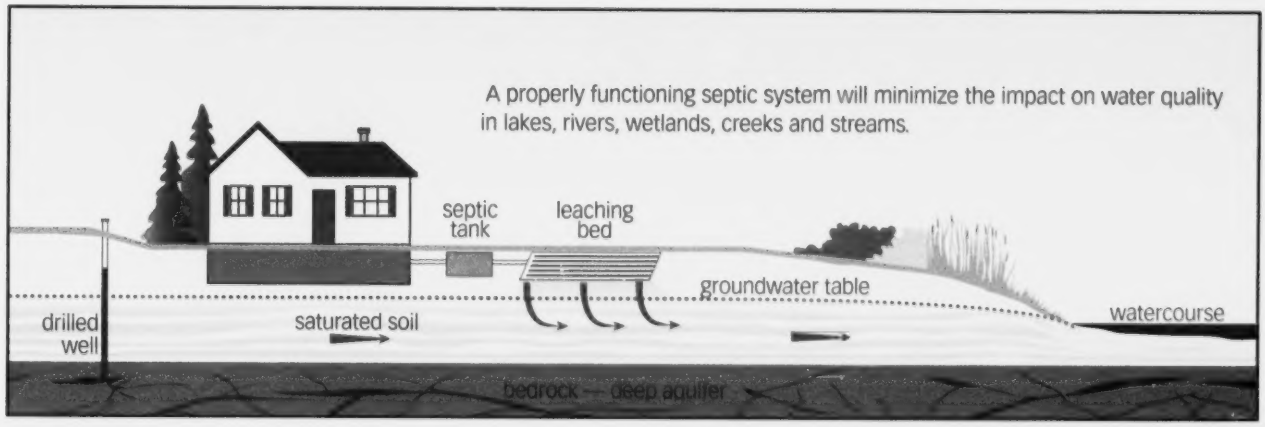
Minimum Separation Distances For Leaching Or Filter Beds



--- *Building Code* required separation distance
--- recommended separation distance

Raised leaching and filter beds have increased separation distances. The elevation of finished grade minus existing grade x 2 is added to the minimum separation distances.

For Example: The difference between existing grade and finished grade elevation = 1.5 metres (5 feet)
1.5 metres (5 feet) x 2 = 3 metres (10 feet)
Therefore, add 3 metres (10 feet) to all separation distances
i.e., 15 metres (50 feet) to drilled well now becomes
18 metres (60 feet)


A properly functioning septic system will minimize the impact on water quality in lakes, rivers, wetlands, creeks and streams.
septic tank
leaching bed
groundwater table
watercourse
drilled well
saturated soil
bedrock – deep aquifer

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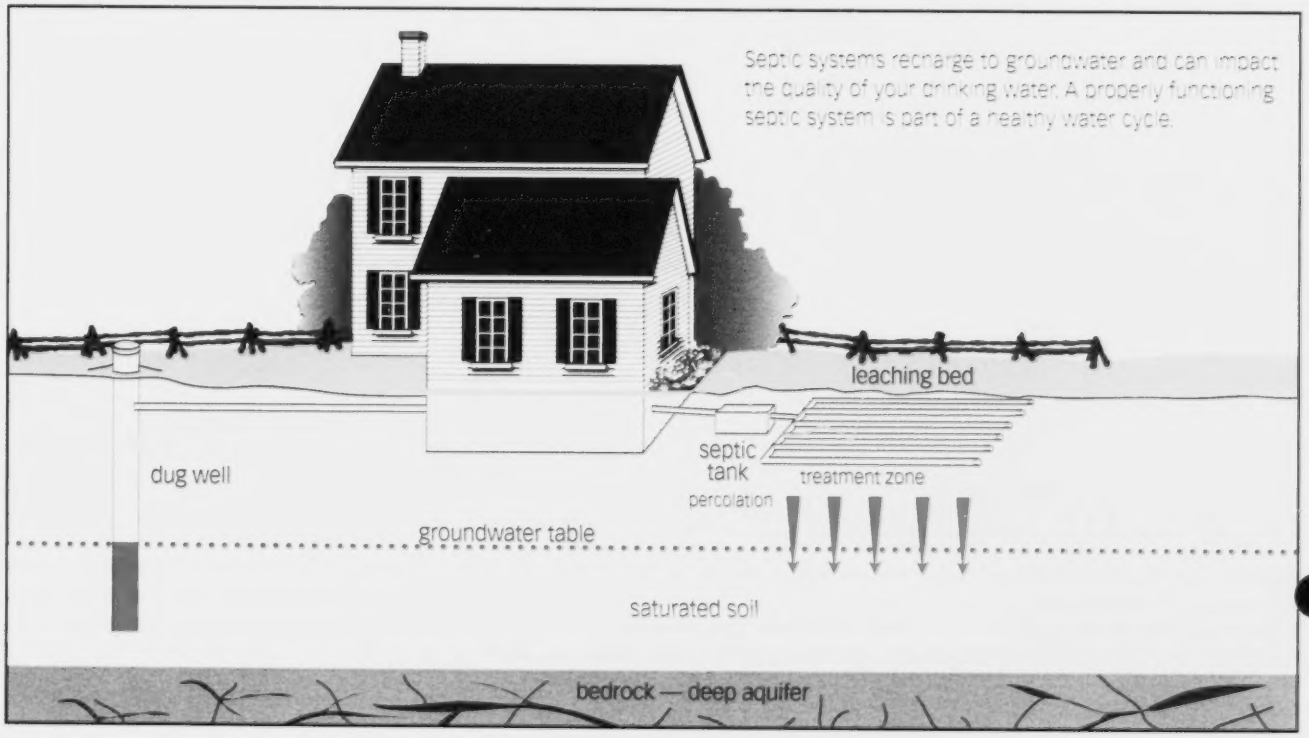
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septic tank
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percolation
dug well
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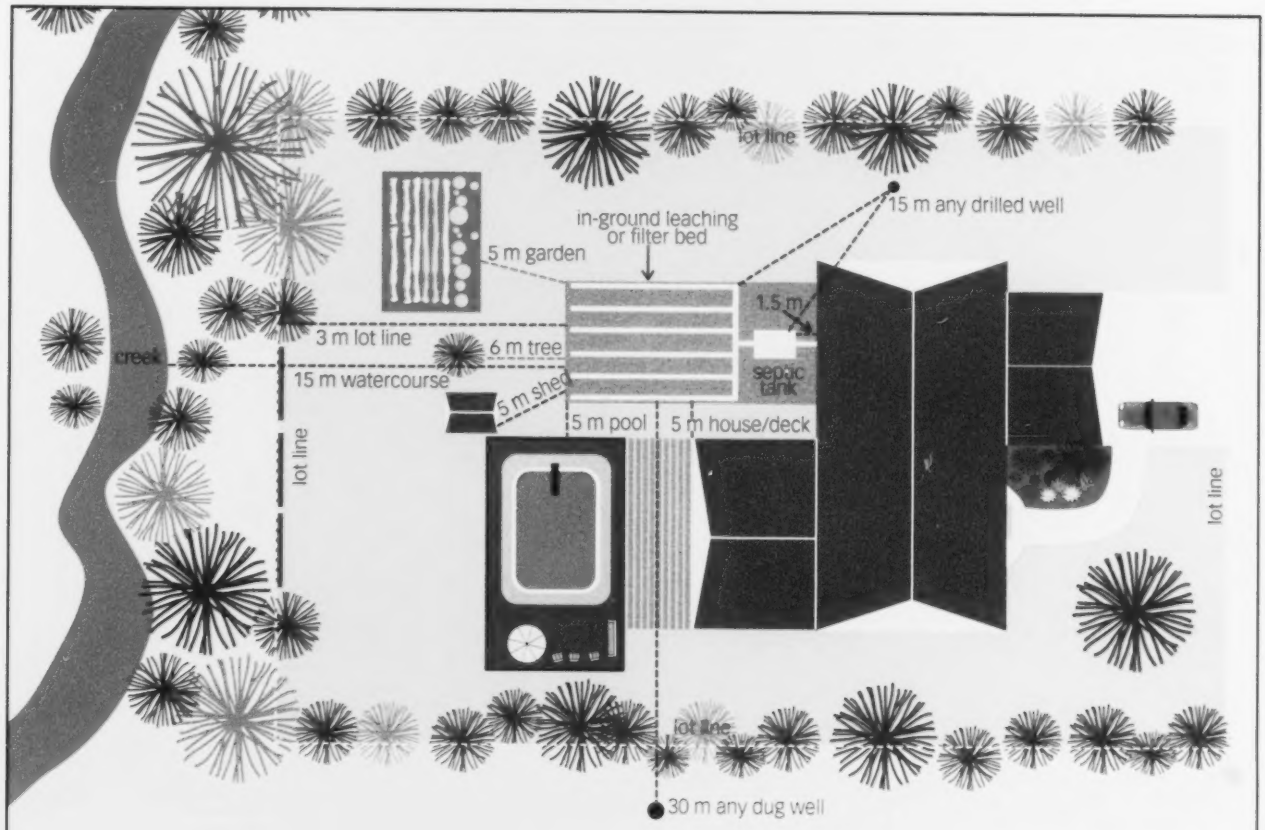
bedrock — deep aquifer

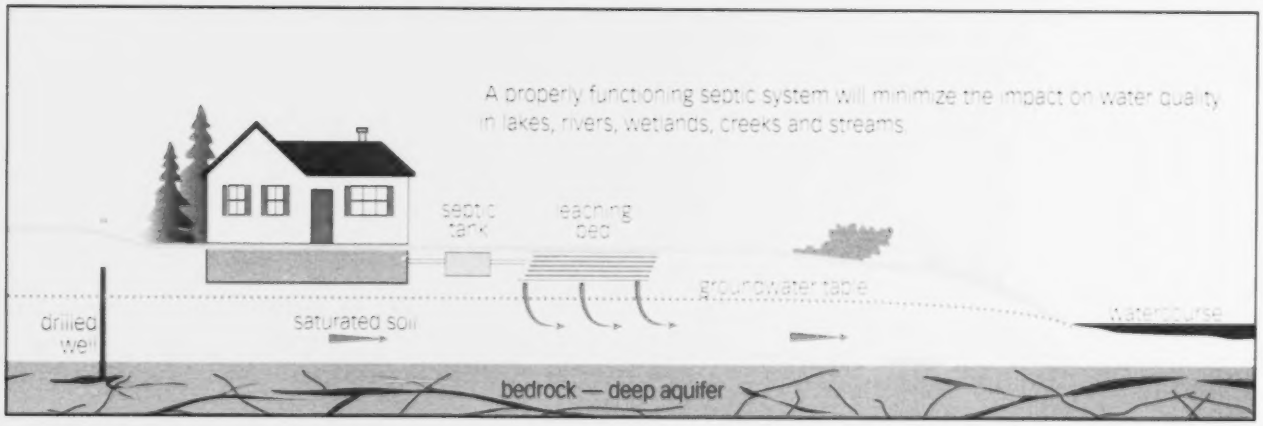
Minimum Separation Distances For Leaching Or Filter Beds



--- Building Code required separation distance
··· recommended separation distance

Raised leaching and filter beds have increased separation distances. The elevation of finished grade minus existing grade x 2 is added to the minimum separation distances.

For Example: The difference between existing grade and finished grade elevation = 1.5 metres (5 feet).
1.5 metres (5 feet) x 2 = 3 metres (10 feet).
Therefore, add 3 metres (10 feet) to all separation distances
ie. 15 metres (50 feet) to dry well now becomes
18 metres (60 feet).

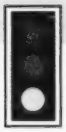

A properly functioning septic system will minimize the impact on water quality in lakes, rivers, wetlands, creeks and streams.
septic tank
leaching bed
groundwater table
drilled well
saturated soil
watercourse
bedrock — deep aquifer

Why Should I Maintain My Septic System?

Did you know that septic systems are the responsibility of you the homeowner? It is up to you to keep your system working properly to protect your environment, your health and your investment.

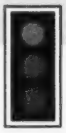
When properly designed, constructed and maintained, a septic system should provide long-term, effective treatment of your household wastewater. If you take good care of your system, you will save yourself the time, money and worries involved in replacing a failed system. Failed systems can be hazardous to your health, the environment and your pocketbook. It can degrade water supplies and reduce your property value. Below are some valuable tips to ensure the longevity of your system.

A licensed sewage hauler or onsite sewage system professional should remove the septic tank cover and inspect the system every three to five years and pump out the solids and scum when required.



Do:

- familiarize yourself with the location of your system
- keep the tank access lid secured to the riser at all times
- keep an as built system diagram in a safe place for reference
- keep accurate records of septic system maintenance and service calls
- test your well water at least three times a year — spring, summer and fall — for indicator bacteria
- have your tank inspected for sludge and scum buildup on a regular basis (3-5 years) and clean out when a third of the depth of your tank is full of sludge and scum
- have your effluent filter checked and cleaned every year; if you don't have an effluent filter, consider adding one
- divert surface water away from your leaching bed
- conserve water in the house to reduce the amount of wastewater that must be treated
- repair leaky plumbing fixtures
- replace inefficient toilets with low-flush models
- consider installing a lint filter on your washing machine's discharge pipe
- spread the number of loads of laundry throughout the week



Don't:

- enter a tank — gases and lack of oxygen can be fatal
- put cooking oils or food waste down the drain
- flush hazardous chemicals, pharmaceuticals, cigarette butts or sanitary products
- use a garbage disposal unit/garburator unless your system has been designed for it
- use special additives that are claimed to enhance the performance of your tank or system — you don't need them!
- dig without knowing the location of your leaching bed
- drive or park over your tank or leaching bed
- pave over your leaching bed
- allow livestock on the leaching bed
- plant trees or shrubs too close to the septic tank or leaching bed
- connect rain gutters, storm drains, sump pumps or allow surface water to drain into a septic system
- connect leaching bed or greywater system to agricultural field drainage
- discharge water softener backwash to the septic system unless your system has been designed for it
- drain hot tub and spa water to the septic system

Ask To See The License!

Anyone in the business of pumping and cleaning septic tanks must be licensed by the Ontario Ministry of the Environment.

Anyone who installs, repairs or services septic tanks must be licensed by the Ontario Ministry of Municipal Affairs and Housing.

How To Find Your Septic Tank

The first step in finding your septic tank is to find your records. All recent septic system approvals paperwork should contain an as built drawing that will help you find the system. If you don't have a copy of the paperwork, a copy may be available from your local regulatory agency.

If you don't have an as built drawing, start by trying to locate the septic tank. Go to your basement and look where your sewer pipe leaves the foundation. Try to find this same spot on the outside of the house. As a good starting point, measure out 1.5 metres (5 feet) from the house. Using a blunt metal probe, try to identify the corners of the tank. It may take some time based on how deep the tank is buried. Be sure to exercise proper caution — if gas pipes or utility lines lie close by, be sure to call before you dig.

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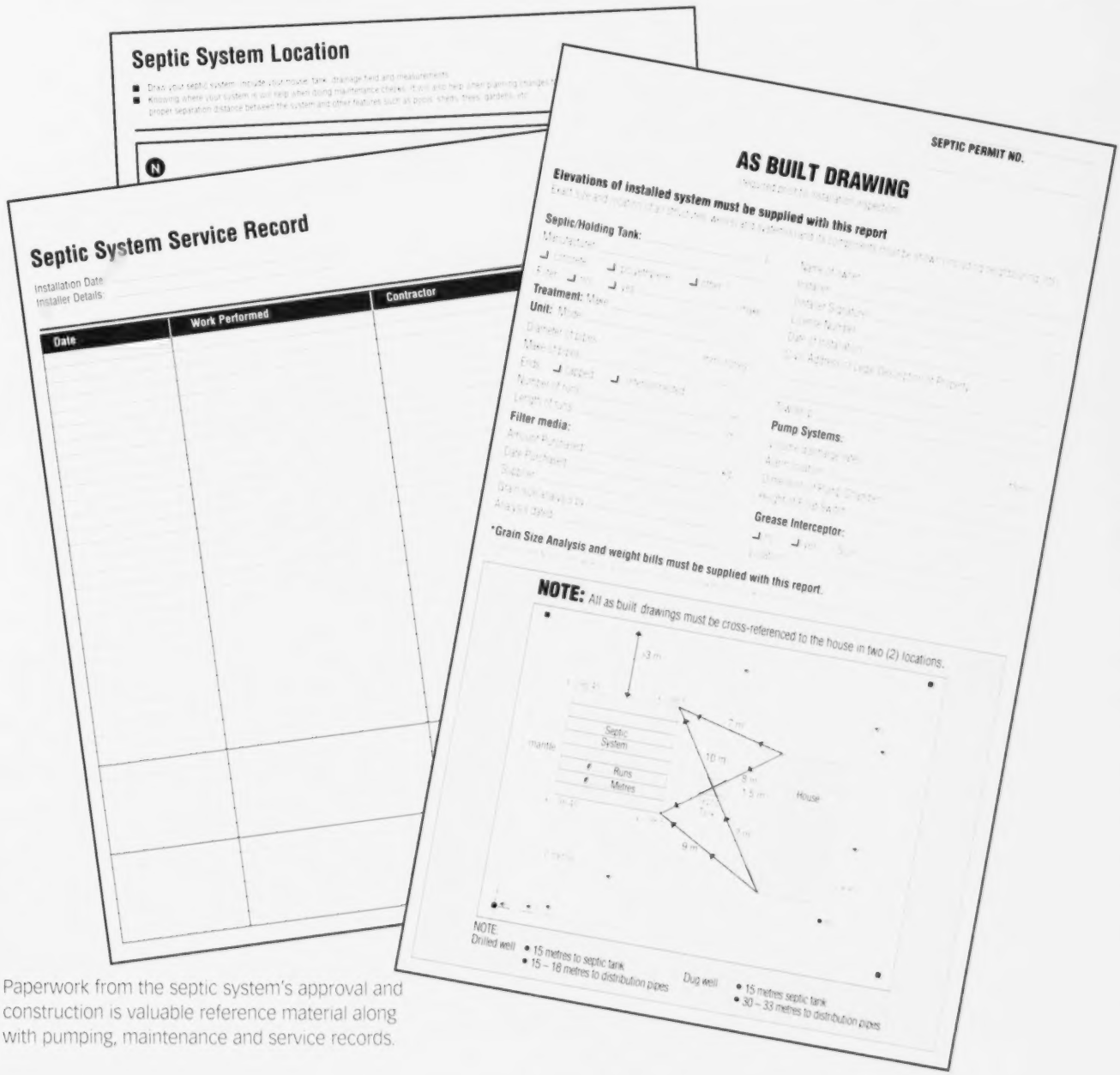

Paperwork from the septic system's approval and construction is valuable reference material along with pumping, maintenance and service records.

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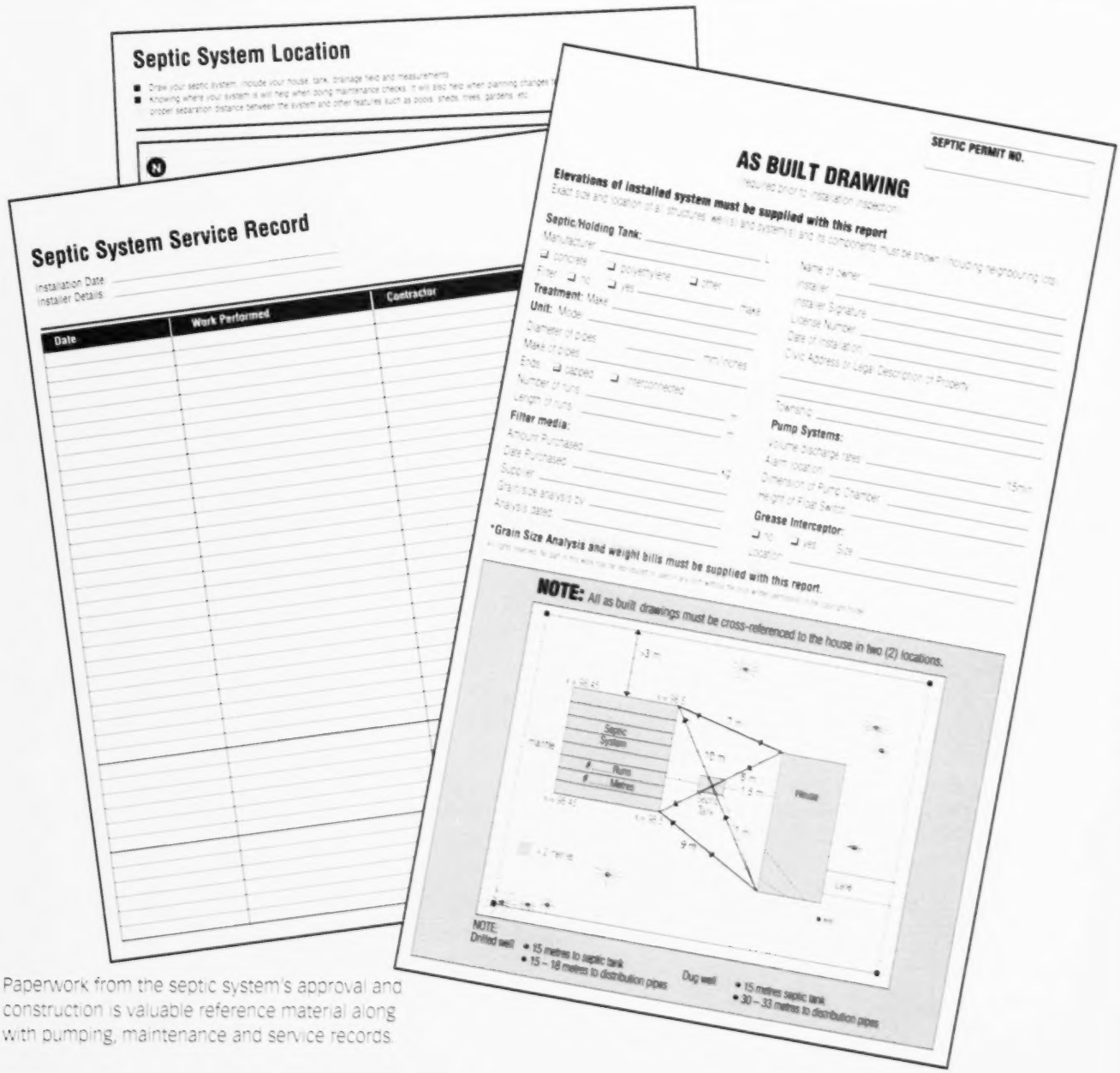

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What Happens When There's A Problem?

Septic systems have a lifespan of approximately 15-40 years. To maximize the lifespan of your system, follow the "Do and Don't" list on page 8.

A malfunctioning septic system is easy to see . . . and smell. If you suspect you have a problem with your septic system, it is important to fix the problem quickly. A malfunctioning septic system is a risk to your environment and your health. It can quickly contaminate groundwater and surface water used as drinking water sources.

If failure occurs shortly after construction, it may be the result of poor site assessment, poor design, poor construction practices or homeowner abuse.

If you think there's a problem, start by having the septic system inspected. The tank may just need a cleaning. However, if there is a problem with the leaching bed, you will want to speak to an onsite sewage system professional for their advice. Onsite sewage system professionals include installers, professional engineers, certified engineering technologists and registered sewage system designers. A second opinion is always recommended.

Some Symptoms of a Malfunctioning Septic System:

- household drains slow down
- toilets back up
- sewage smell in yard
- grass over sewage system is unusually green and/or spongy
- bacteria or nitrate contamination shows up in well water
- surface ponding of effluent

If a homeowner has a malfunctioning septic system, the big question is, "Do I have to replace the whole system?" Repairs can range from cleaning a few lines to replacing entire leaching beds and removing contaminated and clogged soils. An onsite sewage system professional should be retained. Their first task will be to determine the cause of the failure.

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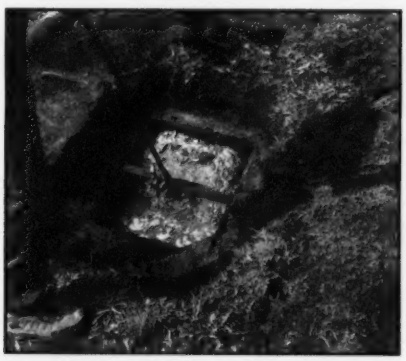

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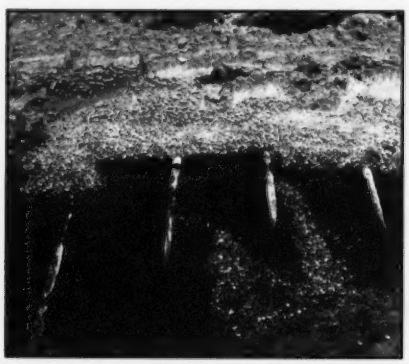
Effluent pond on top of the leaching bed.



A failed system exposed.

New Technology

Alternative technology for treating wastewater for individual homes has been around since the 1970s but uptake has been slow. Only in the late 1990s did new technologies become more readily available thereby providing more choices for homeowners.

Sometimes alternative technology may be the only option. Conventional systems sometimes don't work on smaller lots, waterfront properties or when replacing systems in a confined area.

Alternative technologies may be required to reduce certain contaminants (e.g., nitrate) if your property is located in a vulnerable groundwater or surface water area as identified through local source water protection studies. Contact your local conservation authority or municipality to learn about any programs for cost sharing opportunities, technology upgrades or replacements.

The research and development of alternative technologies have made it possible to produce an effluent of the same quality or even better than some large municipal treatment plants. Homeowners should not be afraid to consider new approved technology such as Aerobic Treatment Units (ATUs) and Media Filters. Your local onsite sewage system professional can help you select the right technology for your site.

Water Conservation

Water conservation is always a good thing. When it comes to your septic system, the more a household conserves, the less water enters the septic system. Efficient water use can improve the bacterial action of the septic system and reduce the risk of failure.

- Check for leaky taps and leaking toilets. Each small drip adds up.
- Replace your inefficient toilets with a low-flush, high-efficiency or a dual flush toilet (up to a 50 percent reduction in water use).
- Use faucet aerators and high-efficiency showerheads to reduce water use (up to a 30 percent reduction in water use).
- Take short showers instead of baths.
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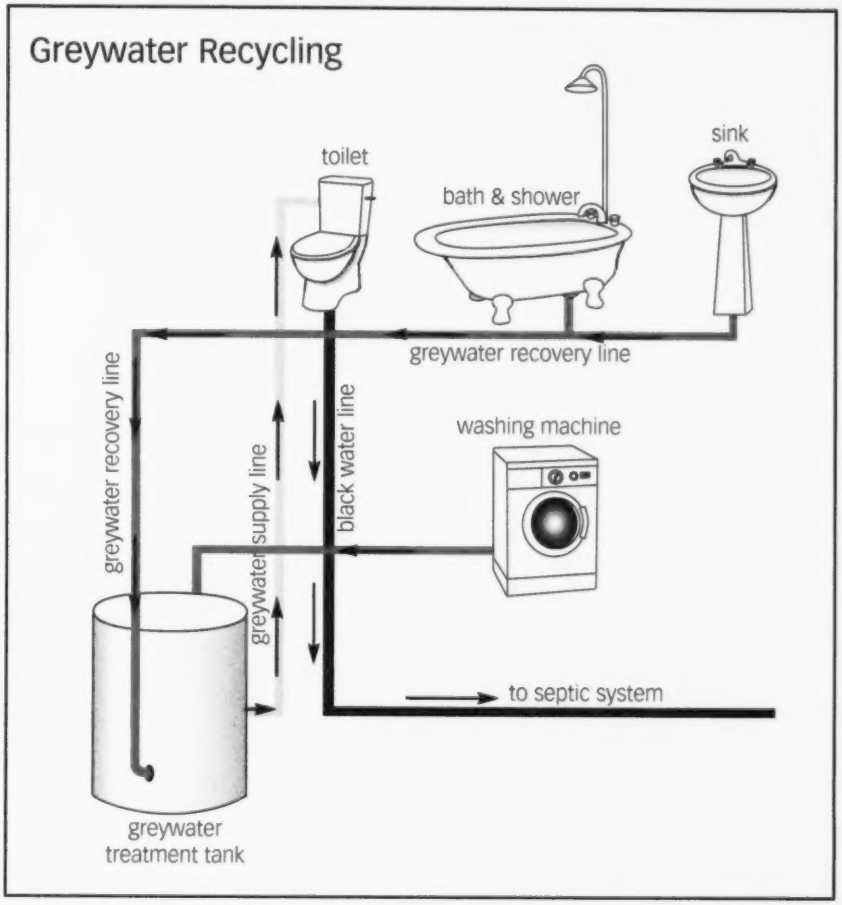

If you have recurring potable water shortages and are building a new home, you may want to consider recycling your greywater. Greywater recycling collects wastewater from the bath, shower, dishwasher and washing machine. It is treated and reused for toilet flushing. Greywater is not to be used for drinking water or bathing. It requires disinfection to prevent fouling the system.

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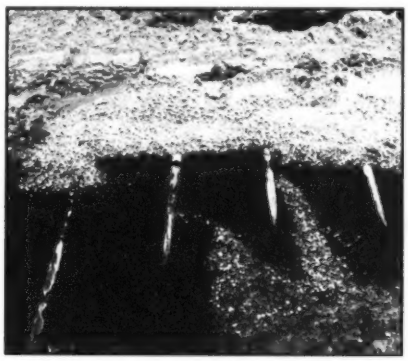

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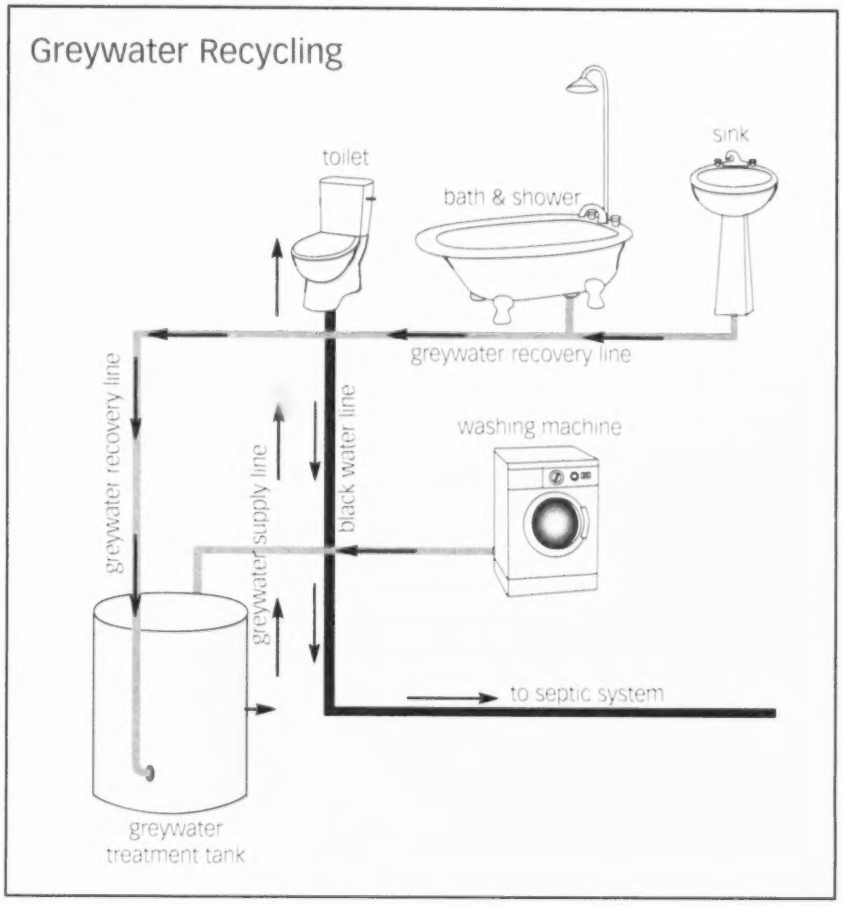

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Design and illustration by:

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Technical Review Committee Members:

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